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GEORGE THE THIRD'S VISIT TO ST. PAUL'S.

INTERIOR OF THE CATHEDRAL ON THE OCCASION.

If there ever was an occasion on which a whole nation was deeply concerned for the personal well-being of a sovereign, it was in the year 1788, when George the Third, not yet passed what may perhaps be termed the prime of life, was seized with an awful malady which prevented him from superintending those important affairs which devolve upon the monarch of a great country. The details connected with that portion of English history are well deserving of our attention.

In the month of July, 1788, the king prorogued parliament in person, and appeared to be in his usual state of health. But shortly afterwards a slight indisposition came upon him, which induced his physicians to recommend a visit to Cheltenham for a time. This visit appeared to be productive of benefit, and the king returned to Windsor apparently much improved in health. The hopes which had been thus raised, however, were doomed to be of no long continuance: for by the end of October the king had gradually become so ill that it could no longer be concealed that the malady was of a nature peculiarly afflicting and dreadful: a mental derangement had taken place, which rendered him totally incapable of attending to public business.

The parliament stood prorogued to November 20th. On the 14th circular letters were addressed to the members of the legislature, signifying that the indisposition of the sovereign rendered it doubtful whether there would be a possibility of receiving his commands for the further prorogation of parliament. If not, in that case the two Houses must of necessity assemble, and the attendance of the different members was earnestly requested. The delicate position of affairs at this juncture is forcibly described by the Rev. G. R. Gleig, in his *Family History of England*, Vol. III.

A great problem was submitted to the legislature for solution. The throne was not vacant, yet the individual

who occupied it was incapable of transacting business; and the calamity having occurred during a prorogation, there seemed to be no power vested anywhere, either to postpone or to hurry forward the period of their meeting. Under these circumstances the houses of parliament assembled on the 20th of November, the day specified in the royal proclamation, but they took no subject into consideration; indeed this meeting was an act of mere form, which was followed immediately by an adjournment for fifteen days. During that interval the king's physicians were examined before the Privy Council, and gave it as their opinion, that though it was impossible to fix the limits of his disease, the king's recovery was by no means to be despaired of. What then was to be done; for who could give the force of law to any Act of Parliament, to which it was impossible to procure the royal assent?

Mr. Pitt was at that time in the administration; and after he had proposed that the journals of the House should be searched, in order to find a precedent which might guide them on the present occasion, Mr. Fox replied, that there were notoriously no precedents which applied to the present instance; that all which was requisite to their ultimate decision had been obtained in the report of the physicians; that he therefore advanced it as a proposition deducible from the principles of the constitution, and the analogy of the law of hereditary succession, that whenever the sovereign was incapable of exercising the functions of his high office, the heir apparent, if of full age and capacity, had as indisputable a claim to the exercise of the executive authority, in the name and on behalf of the sovereign, during his incapacity, as in the case of his natural demise; and that consequently the prince of Wales had a right to fill the throne as a proxy for his afflicted father.

This question of right was warmly disputed by Mr. Pitt, who ultimately carried a motion for inquiry into the best steps to be taken on the occasion. On the 16th of December, Mr. Pitt moved, and the House agreed to, the two following declaratory resolutions: first, one relating to the interruption of royal authority; and a second, stating that it was the duty of parliament to provide the means of supplying that defect. The ministry then proceeded to make the necessary arrangements of appointing a regency. We may here remark, that all parties were agreed as to the propriety of appointing the prince of Wales to the office of Regent during the king's illness; but there were various opinions as to the condition on which that appointment should be made.

On December 23rd a resolution was passed, empowering the lord chancellor to affix the great seal to such bill of limitation as might be necessary to restrict the power of the future regent. Some time after this, as there was a difference of opinion among the physicians respecting the probability of the king's recovery; a fresh committee of inquiry was instituted; but the result did not produce anything satisfactory.

At length a measure was brought into parliament, January 16th, 1789, by which the care of the king's person, and the disposition of the royal household, should be committed to the queen, together with the patronage which belongs to the sovereign respecting appointments to the household, &c.; and that the kingly authority should be vested in the prince regent, during the indisposition of the king, but with certain restrictions respecting granting pensions, creating peers, &c. Violent party debates followed this proposition; but into these we shall not enter. It is more gratifying to be able to state, that while the discussions were still going on, the lord chancellor announced to the House of Peers that the king was declared by his physicians to be in a state of convalescence. This was followed by a declaration, on the 10th of March, that His Majesty, being perfectly recovered from his indisposition, had ordered a commission to be issued for holding the parliament in the usual manner.

Thus were all difficulties about the regency removed; and the most joyous manifestations at the king's recovery were made throughout the country. In all the considerable towns there were bonfires, illuminations, and holydays; while medals were struck, odes written, and songs composed on the occasion. "Nor," to use the words of Mr. Gleig, "was the feeling diminished when the citizens of London beheld the use to which their beloved monarch first turned his renewed mental vigour. A solemn procession to St. Paul's, and a public thanksgiving to the KING OF KINGS, showed the force of those pure religious principles which gave a turn to all this good monarch's proceedings." The events of that interesting day we will briefly describe.

On the 25th April, 1789, a general thanksgiving was ordered, for the recovery of His Majesty; and on that day the king himself, accompanied by the queen, the prince of Wales, the dukes of York, Gloucester, Cumberland, and Clarence, and the princesses royal, Elizabeth and Augusta, went in solemn procession to St. Paul's cathedral, attended by both Houses of Parliament, the great officers of state, the judges and other public officers, to return thanks to God for the recovery of the king.

The procession began about eight o'clock, by the House of Commons (of whom 167 members attended) proceeding from the House to St. James's palace, towards which other persons, who were to join in the procession, also went. About ten o'clock the royal family left the palace, the king and queen in a state coach, and the other branches of royalty following in other carriages. They were preceded by the members of the House of Commons, the masters in chancery, the judges, the peers, and the lord chancellor. The whole cavalcade passed through the Strand, and the royal coach reached Temple-bar about twelve o'clock. Here they were received by the city authorities, who were mounted on white horses, richly caparisoned, with silver roses, and silk reins, blue and gold furniture, and the fronts of the bridles embroidered with the words, "GOD SAVE THE KING." The lord mayor had a gown of crimson velvet, and the aldermen were correspondingly attired.

The city authorities then preceded the royal visitors from Temple bar to St. Paul's, where they arrived soon after twelve. They were met at the west door of the cathedral by the bishop of London, the dean of St. Paul's, the canons residentiary, and the kings and other officers of arms. The procession then passed into the cathedral in the following order:—The archbishop of York, the lord chancellor, the archbishop of Canterbury, fourteen bishops, the aldermen and common-councilmen, the lord mayor, the earl marshal, the royal dukes, the king, the queen, the princesses, gentlemen pensioners, &c. The other parts of the procession went to the respective places allotted for them. The peers had seats in the area, and the commoners in the stalls: the upper galleries were allotted to the ladies of the queen's bed-chamber, the maids of honour, and such other ladies of distinction as attended on the occasion. The foreign ministers were placed in the two lower galleries next to the throne; and the lord mayor and aldermen in the lower galleries near the altar. But perhaps one of the most striking parts of the scene was the appearance of six thousand charity children, who were seated in a spot prepared for them, and who commenced a hymn directly the royal visitors approached.

The more immediate occupants of the principal part of the building were thus arranged:—the king and queen were on a platform, at the west end of the choir, with a canopy similar to that in the House of Lords, with three ascending steps; the princesses occupied the choristers' seats on the north side of the choir; on the opposite side were the royal dukes: the area of the choir was appropriated by the peers; the judges, masters in chancery, &c., sitting on woolsacks. The peeresses were seated in stalls on each side of the choir.

When all were seated, the service began by a prayer, chanted by one of the minor canons of the cathedral; the responses, which were set to music for the occasion, being made by the whole choir, accompanied on the organ by Mr. Jones. Then followed *Te Deum* and *Benedictus*, which were composed for the occasion, and sung by the choir, assisted, in the choruses, by the six thousand charity children. The *Litany* was then chanted by the Rev. W. Hayes and the Rev. J. Gibbon, minor canons of the cathedral. Then followed the Communion Service, which was read by the dean and the residentiaries. The *Kyrie Eleison* and *Creed*, arranged by Purcell, were then sung by the whole choir, accompanied on the organ. After this followed a sermon by the bishop of London, from the text, Psalm xxvii. 16: "Oh tarry thou the Lord's leisure: be strong, and He shall comfort thine heart: and put thou thy trust in the Lord."

The sermon was followed by an anthem, composed for the occasion, and the service was concluded by the offertory, which was read by the Rev. Dr. Farmer. The whole ceremony lasted until three o'clock.

The king was dressed in the Windsor uniform. The queen and the princesses wore blue silk dresses, trimmed with white; and they, as well as nearly all the ladies present, had bandeaus on which were inscribed "God save the King." Most of the gentlemen wore purple and white sword-knots, with a similar inscription.

When their majesties were leaving the cathedral, the whole of the charity children sang the 104th Psalm, with an effect that can only be understood by those who have attended the cathedral on the annual assembly of the charity children there. The cavalcade then returned to the palace nearly in the same order in which it left there in the morning.

We have no space to detail the round of festivities which followed this visit to St. Paul's; nor is there much necessity for so doing. Illuminations, grand banquets, and congratulatory addresses, are frequent attendants on occasions of public rejoicing; but the visit of all the great and noble in the metropolis—we may almost say in the kingdom—to St. Paul's cathedral, and the performance of divine service there, was an event worthy of being singled out for remembrance by subsequent generations.

It must be known to our readers, that the recovery of the king was not doomed to be followed by lasting health. The last years of George the Third's life were passed in that privacy which was a necessary acompaniment of an alienation of intellect: an alienation which disqualified him alike from governing a kingdom, and from enjoying the usual pleasures of a rational mind.

AUTHORS should avoid as much as they can replies and rejoinders, the usual consequences of which are loss of time, and loss of temper. Happy is he who is engaged in controversy with his own passions, and comes off superior; who makes it his endeavour that his follies and weaknesses may die before him, and who daily meditates on mortality and immortality.—JORTIN

KIMMERIDGE COAL-MONEY.

IF the reader will refer back to p. 31 of this Volume, No. 453, he will find a drawing and an account of a very curious and mysterious article, which was there termed KIMMERIDGE COAL-MONEY, from the circumstance that the substance of which it is composed is of a *coaly* nature, is in shape and figure like pieces of money, and is found in the Bay of Kimmeridge, in Dorsetshire.

When we put forth the article in question, we thought that we had said all that could be safely said respecting these interesting remains of antiquity, in describing their locality and their existence, and pointing attention to the potteries of the Phœnicians; but a correspondent having furnished us with some very clever and feasible suggestions, which help to carry out the subject of the coal-money, and to account for its existence, we feel it our duty to give our readers generally the benefit of his reflections.

Mr. Jabez Allies, of Catherine Villa, near Worcester, observes that such pieces, or blocks, called *coal-money*, were most likely used as models or moulds in making the pottery at the Phœnician settlement in the Isle of Purbeck; and that several of these blocks, placed one upon another, from the smallest to the largest, and then *vice versâ*, formed a model for an urn or a vase from the small of the foot to the top; and the foot might have been formed in the same manner by reversing one or two blocks; and such blocks being larger on one side than the other, would exactly suit such a purpose. The potter, in order to make a great number of vessels of the same size as the pattern, (either at the wheel or in the lathe,) had only to use a pair of compasses or callipers occasionally; and although experienced hands might not always have wanted such assistance, yet the learners in the art most probably required it.

A single block, with the largest size upwards, is the exact shape of a *patera*, or goblet, and might have been used either as a mould in making that article, or as a model to regulate the size of such pottery, on turning the clay, either at the wheel or in the lathe.

Whole urns or vases (particularly those which were too small in size to admit the hand of the potter into the interior of them at the wheel) might also have been made with these different sized blocks, by forming circles of clay upon the rims of them, and then by taking out the blocks before the clay was dry, and neatly and firmly fitting the circles of clay upon one another; and afterwards such urns or vases, when dry, might have been turned in the lathe.

The devices on some of the blocks were probably used in fitting or steadying one block upon another, and occasionally in making impressions upon the clay. If any of the fragments of the pottery should be found to contain similar stamped marks, it might lead us to infer that some of the devices at least were made and used as patterns to assist the unpractised workman in forming circles, &c. on the pottery.

The large stone, resembling a piece of coal-money, mentioned in the former paper as lying in the Bay of Worthbarrow, most probably was a mould for very large pateras, and might have been chiefly used for sacrificial purposes. The earthenware patera which was found, containing a young bullock's head, appears to corroborate this hypothesis. In conclusion, the ancient monument situate at the N. E. extremity of Purbeck, called Degle-stone, or Stone-Barrow, is said by several writers to have the character of the *Logan** stones of the Britons or Phœnicians. Some persons likewise consider the antique remains here alluded to to be of a Romanized British character

* See *Saturday Magazine*, Vol. VII., p. 183.

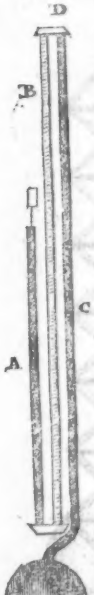
THE PENDULUM. IV.

THE compensation-pendulums described in the last paper, have all been tried, and have succeeded in performing their office; but they have never become so common as the *gridiron*-pendulum, which, though more complicated than the rest, is by far the best known, because it was one of the first attempts to make the expansions of different metals counteract each other.

This pendulum was invented by Harrison, in 1726, and frequently goes by his name. But, before describing it minutely, we will consider the principle on which it acts, in the case of another form of pendulum.

Suppose a pendulum to be constructed, as in the annexed figure, where the rod A, instead of passing directly from the spring to the bob, bears at its lower end a short piece of metal, from which rises the rod B, of a more expansible material than A, and bearing at its top a cross-piece D, from which hangs the long bent rod C, of the same material as A, and holding the bob. In this arrangement the rods A and C must, when heated, expand *downwards*, because they hang, or are fixed, by their upper ends: but the rod B can only expand *upwards*, because it has its lower end fixed. Now, although the entire length of the rod B cannot obviously be so great as that of A and C together, yet, by making it of a different metal, we may cause its expansion, under a certain increase of temperature, to be just the same as that of the greater length contained in A and C together. Then the expansion *upwards* will be as great as the expansion *downwards*, and the tendency to *raise* the bob as great as the tendency to *lower* it; and the bob will therefore never move, but remain in the same place both in hot and cold weather, unaffected by the expansion or contraction of the rods, by which it is suspended. In order to effect this, the rods must bear a certain ratio to each other, depending on the different expansibilities of the metals *steel* and *brass*, which are commonly employed.

Fig. 13.

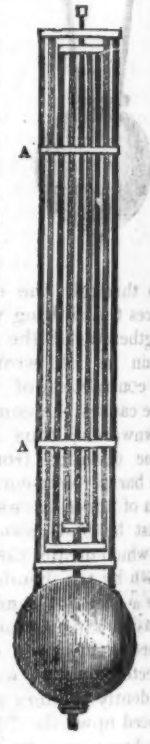


The expansibility of brass, compared with that of steel, is as 1 to ·6091; that is to say, if a brass rod of a certain length, exposed to a certain increase of heat, expands one inch, then a steel rod, of the same length, exposed to the same increase of heat, will expand ·6091 of an inch. Now if we want two bars, one of brass and the other of steel, which (though unequal in length) shall expand equally, for equal increments of heat, the steel rod must obviously be longer than the brass, in the ratio of 1 to ·6091. Therefore, in the pendulum shown above, the brass rod B must be ·6091 of the length of the two steel rods A and C together; and the difference between these two lengths, or the length of the rod A, must (for seconds) be about 39¼ inches. Hence, the whole length of the apparatus will be more than five feet: there will be nearly as much of the pendulum-rod above as below the point of suspension; and, in all clocks, the pendulum, if constructed in this manner, will be nearly double its usual length—an affair manifestly awkward and inconvenient.

The long rods B and C are, therefore, each divided into two portions; that is, instead of one brass rod, to compensate two steel ones, there are two brass rods, to compensate three steel ones; and thus they can generally be all made of about the same length, provided that the total length of the brass be to that of the steel as ·6091 to 1, and that all the brass rods expand upwards, and the steel downwards. Then the piece D is not above, but rather below, the point of suspension; and the rod C, instead of bearing the bob, bears a cross-piece, from which rises a second brass-rod, having on its upper end a cross-piece, from which hangs a steel rod, bearing the bob. Thus there is the expansion of two brass bars upwards, to compensate for that of three steel bars downwards; and this is generally found sufficient. Care must, however, be taken that the ratio of brass to steel be preserved, how many bars soever we use; else the brass may over-correct the steel, and consequently the pendulum may *shorten by heat* and *lengthen by cold*, contrary, in appearance, to the ordinary law of the case.

As the gridiron-pendulum, so called from its appearance, is usually constructed, the whole of this arrangement is doubled, in order to preserve a symmetrical figure and steady frame-work. It then consists, (as shown in the annexed figure) of nine parallel bars, all lying in one plane. They are alternately steel and brass, beginning and ending with steel, (which is represented by the darker bars in the cut); and they are connected together by cross-bars of any substance in the following peculiar manner.

Fig. 14.



The two long cross-bars AA are only fixed to the two outer steel bars. All the other rods pass through large holes made in AA; so that these cross-pieces do not at all interfere with the motions of the rods. They have, therefore no influence on the compensation, and may be neglected; for their only use is to strengthen the combination, and form with it a compact frame-work. The central rod is of steel, and hangs from the cock by a spring, as in the common pendulum. It answers to the rod A in fig. 13, and passes through large holes in the two uppermost cross-pieces, so as not to touch them; but it carries at its lower end a very short cross-piece, from which rise two brass bars, one on each side, answering to B in fig 13. These support on their tops a rather longer cross-piece, from the outer ends of which hang two other steel bars, carrying at their lower end a still longer cross-piece, which supports two more brass bars. These are connected at the top by a yet longer cross-bar, from the ends of which hang the two outer steel rods, whose lower ends are likewise connected together; and from the centre of the connecting piece hangs the bob, which can be adjusted by a screw, as in the common pendulum. An attentive examination of fig. 14. will soon convince the reader, that it acts on the same principle, as the rude specimen shown in fig. 13.

Although this is the most common, it is by no means the best form of the gridiron-pendulum. The most elegant modification of it is that called *Troughton's tubular pendulum*, in which the bars are not placed all in the same plane, but are arranged in a much more compact form, so as to be all enclosed in a tube or sheath, not much more than half an inch in diameter; by which means the whole apparatus is concealed and presents the neat appearance of the simple pendulum, but with rather a thick rod.

In our last paper we described a very simple compensation, effected by a compound bar of brass and

steel, which, owing to the different expansibilities of those metals, warps or bends by variations in temperature. In fig. 15, is represented another compensation, by the same means, but acting on a different principle.

Fig. 15.

This is called *Doughty's pendulum*. In it the bob is suspended by two rods BB, which hang by springs from two heads, which slide backwards and forwards on the compound bar A, and are fixed at any part of it by screws. This compound bar is suspended, as shown in the figure, by a short rod fixed to its centre, and having at its upper end a spring to allow it to oscillate freely. The two bars BB are connected at bottom by a short cross-piece, from which the bob hangs by a rod; the lower end of which is cut like a screw, to receive the nut which adjusts the height of the bob.

As the steel side of the bar A is placed uppermost, the ends of this bar will bend upwards by heat, and downwards by cold, for the reasons given in the last paper. Now as the bob is connected with the ends of A by the rods BB, it will be raised in hot weather; and the proportions of the different parts are so managed, that this raising of the bob through the effect of heat, exactly counterbalances the sinking which it would experience by the lengthening of the rods BB through the same cause. Again in cold weather the bob would be raised by the contraction of BB, were it not that the cold likewise causes the compound bar A to bend on each side downwards; thus keeping the bob always at the same distance from the point of suspension. If the bar A over-corrects the expansion and contraction of the rods BB, the sliding-heads of these rods must be slid inwards, and fixed nearer together; by which means they will not be raised and lowered so much by the bending of A. On the contrary, if the bar A does not bend enough to counterbalance the expansion and contraction of B B they must be separated more widely from each other, that they may be more affected by the warping of the compound bar. It evidently matters not which end of this pendulum is placed upwards. It might have the bob attached to the bar A, and the pendulum spring for suspending it, at the place where in fig. 15 the bob is attached. Such a pendulum is represented in fig. 16: its action will soon be understood by inspecting the figure; but it must be remembered that, in this case, the steel side of the compound bar must be placed downwards.

Fig. 16.

We will describe the principle of one more compensation-pendulum. It is that of Troughton, called the *Rhomboidal pendulum*, which was also invented about the same time by Williams, a clock-maker of Ulverston, in Lancashire.

If we suppose four bars of steel to be fixed firmly together at their ends, so as to form a square frame; as each side of this square expands by heat equally, the whole square will enlarge in size without altering in form. But, let the bars be connected at the angles by joints, then the slightest force applied to two opposite angles of the frame, will make it change its form to that of a *rhombus*, by lengthening one diagonal and compressing the other. If, however, a diagonal bar be added, connecting two opposite angle of the frame, it will, by a well-known principle in engineering, become a *rigid system*, or one whose form cannot be altered by any force that will not bend or break the bars. To apply this, however, to the present subject, let this diagonal rod be made of brass, or of any more expansible metal than that of which the sides of the frame are made. Then the lengthening of this diagonal bar will tend to push asunder the angles at its extremities, and alter the form of the frame by causing the other angles to come nearer together. But the expansion of the side-bars tends to separate these angles: and these two tendencies may be so nicely counterbalanced, as to keep these angles always at the same distance, however much the others may be separated by the lengthening of the diagonal rod. If, therefore, the whole frame were suspended by one of these corners, and a bob attached to the other, it would form an invariable pendulum-rod quite unaffected as to length by changes of temperature.

Fig. 17.

Such a pendulum, however, would be very clumsy, being at least as broad as long. Several small rhomboidal frames are therefore joined together, and this forms Troughton's pendulum, represented in the annexed figure. It must be remembered that all the angles are joints; that the horizontal rods are brass; and the others steel.

When a young woman behaves to her parents in a manner particularly tender and respectful, I mean from principle as well as nature, there is nothing good and gentle that may not be expected from her in whatever condition she is placed. Of this I am so thoroughly persuaded, that, were I to advise any friend of mine as to his choice of a wife, I know not whether my first counsel would not be, "Look out for one distinguished by her attention and sweetness to her parents." The fund of worth and affection, indicated by such a behaviour, joined to the habits of duty and consideration thereby contracted, being transferred to the married state, will not fail to render her a mild and obliging companion.—Fordyce.

Trade increases the wealth and glory of a country; but its real strength and stamina are to be looked for among the cultivators of the land. In their simplicity of life is found the simpleness of virtue—the integrity and courage of freedom. These true genuine sons of the earth are invincible; and they surround and hem in the mercantile bodies:—even if these bodies, which supposition I totally disclaim, could be supposed disaffected to the cause of liberty.

How oft it haps, that when within
They shrink at sense of secret sin,
A feather daunts the brave;
A fool's wise speech confounds the wise,
And proudest princes veil their eyes
Before their meanest slave.—Sir Walter Scott.

PHILOSOPHY OF A SOAP-BUBBLE.

III.

THE collection of facts which we have been hitherto detailing might seem useless and unlikely to lead to any important result, if we did not now endeavour to explain *why* these things happen; and we shall find the inquiry will afford us much information respecting that mysterious body, *light*, concerning the real nature of which we are quite ignorant.

Whatever light may be, this is certain, that a ray of it touching any surface whatever must always undergo one of these three effects: 1st, it is *reflected;* that is, it bounds off according to the laws of Mechanics, without entering the surface; or, 2nd, it is *transmitted,* that is, it continues its course through the body, in a certain direction determined by the laws of Optics, and emerges on the other side of the body; or, 3rdly, it is *absorbed,* that is, entirely extinguished, or so changed as to be no longer light.

Now a beam of white light is a large collection or bundle of single rays, of at least three different kinds, colours, and properties, and differently acted on by the bodies they touch. They are all mingled in solar light; and when such a beam of light falls on an *opaque* body, it is divided into *two* parts: one part is *absorbed,* the other *reflected;* and on the colour of this reflected portion depends the colour of the body. Suppose light to be composed of red, blue, and yellow rays; and suppose a body so acts on this light as to absorb the red rays; then it must reflect yellow and blue rays, which, mixed, form green light; so that that body appears, or is, of a green colour. Hence the absorbed and reflected portions together must form white: in the above instance, the absorbed portion is red, the reflected portion is green; and the red and the green, if again mixed, would form white light. Two colours, which, when mixed together, form white, are said to be *complementary* to each other.

Opaque black bodies absorb all the light that falls on them, and reflect none. Opaque white bodies are those that reflect nearly all, and absorb hardly any.

But with *transparent* bodies, the light is divided into *three* portions. One part is *absorbed,* another is *reflected,* and a very considerable part is *transmitted.* On the colour of the reflected portion depends the colour of the body, when we look *at* it; and on the colour of the transmitted portion depends the colour, when we look *through* it. Thus, many bodies, such as opal and opal glass, appear of a different colour when looked *at,* than when looked *through.* These three,—reflected, transmitted, and absorbed light, would, if mixed together, form white.

But with *white transparent* bodies, as common glass, water, air, soap-bubbles, &c., the absorbed portion is either exceedingly small, or all the colours are absorbed equally; so that the absorption has no effect on the colour of the body, and may safely be left out.

Thus we may consider the light falling on such bodies as being partly *reflected* and partly *transmitted.*

In ordinary circumstances, glass, water, air, &c. reflect a mixture of all the colours, and also transmit a similar mixture, so that both the reflected and transmitted light is white; but this is not always the case. The phenomena we have been describing, show that all such bodies, reduced to very thin plates, reflect some peculiar colour depending on their thickness. Now, if the white light falling on such bodies is divided into two parts, these two parts, the reflected and the transmitted, must be complementary to each other, or must, if mixed, form white. Now the complementary colour of blue is known to be orange; therefore, if a very thin plate reflect blue light when we look *at* it, and absorb none or very little, it ought to look orange by transmission, when we view *through* it, if all this be true.

It does look so, thus accounting for the whole of the light which falls on it, which is disposed of thus:—the blue rays are reflected, and the red and yellow are transmitted, which mixed form orange; and the orange and blue if mixed would form white light, such as first fell on the plate. It is the same with all the other colours of thin plates, as the reader may prove by his permanent soap-bubble, by stooping down and looking up through it. He will then see a series of stripes or arches of colours; and under every blue stripe on the upper surface will appear an orange stripe on the lower surface; the two colours being in every case complementary. In the first order, for instance, under the black space will be a white one; because all the rays falling on this space are transmitted, and reach the eye from *below* the film, but none are reflected so as to meet the eye when placed *above* the film; and from *thence* it appears black. On the contrary, the first arch, which is white from above, will appear dark from below; because all the rays are reflected, and none are transmitted: the film is, in fact, almost opaque, no rays passing through it. The next arch appears, from above, yellow, which is the colour which it reflects; but from below it will appear of a purplish gray, the complementary colour to yellow. All the other stripes act in the same manner, as is distinctly seen in Newton's rings.

It must be remarked, however, that the transmitted rings are never so brilliant as the reflected ones, but are usually very faint; being diluted with some simple white light, which passes through the film unchanged. Owing to this faintness, more than five rings or orders can never be observed by transmission; while by reflection there are generally seven orders of colours.

Now, before we inquire why a mixed beam of light is thus acted on by a very thin plate, it will be well to consider the action of thin plates on *homogeneous* light, or light entirely of one colour unmixed with any other. Such light is very difficult to obtain, but for all common purposes it will be sufficiently pure as obtained from coloured flames, or by passing light through coloured glass, or through a prism. The reader probably knows that by a prism, light is decomposed into the seven colours;—red, orange, yellow, green, blue, indigo, and violet, which may be received on a screen, and form a coloured image called the *prismatic spectrum.*

If a slit or hole be cut in this screen, so as to allow any particular colour to pass through, but to stop all the others (which is easily done), we have, behind the screen, a beam of homogeneous light of that colour. Such light is *simple:* it cannot again be decomposed by another prism.

Now when we look at a thin plate, or a soap-bubble, in such light, say *red* light, the plate cannot, evidently appear of any other colour but red; for there is no other colour to reflect or transmit. The plate will then act thus. At the very thinnest part, where the black spot appears in common light, all the red light is transmitted, but none is reflected. Therefore, this part appears black by reflection, but red by transmission. At a part a little thicker than this, is a space which reflects all the light, and transmits none; such a space is red when looked at in front, but black from behind. The next stripe is black in front but red behind, and so on alternately. If the lenses likewise be examined in such light, there will be a series of rings, alternately black and red, with a black spot in the middle by reflection. But when looked *through,* the case is reversed; there is a red spot in the middle;

and for every black ring in front, there is a red one behind; and *vice versâ*. In any other kind of homogeneous light, the effect is similar; except that the light rings are of the colour of the light in question, instead of red. The other rings are always black. The reader may examine his permanent bubble by homogeneous yellow light, by dissolving some common salt in a little spirit of wine, and lighting it in a dark room.

When, however, the action of thin plates on various *coloured* lights is seen, there is one remarkable circumstance which accounts for the various colours seen in *white* light. It is this, that, if we examine Newton's rings in red light (which is the least *refrangible* kind of light), we shall observe the stripes or rings of black and red to be much broader than the stripes of violet and black in violet light, which is the most refrangible. All the other prismatic colours produce stripes or rings of intermediate breadths, according to their refrangibility; but between red and violet, or the broadest and narrowest rings, the difference is so marked as to be instantly recognised by every observer.

Now, when white light, or a compound of all the simple colours, is employed, each kind of coloured light forms its own peculiar system of rings. If all the rings were of the same breadth, all the dark rings would coincide and form black, and all the coloured ones would coincide and form white, and a system of alternate black and white rings would be the result. But, as the rings of the different colours are not of equal breadth, they do not coincide, but mix in different proportions, and form a system of colours. Thus, if we could find any transparent colours, exactly resembling those of the spectrum, and seven circular pieces of glass were taken; the first painted in black and red stripes to represent the appearance of the bubble in red light, another like its appearance in orange light, and so on; and all these painted glasses were superposed, and looked through at once, they would present the appearance of the bubble in white light.

How common it is for men first to throw dirt in the face of religion, and then persuade themselves it is its natural complexion! They represent it to themselves in a shape least pleasing to them, and then bring that as a plea why they give it no better entertainment.——STILLINGFLEET.

THERE is no manner of inconvenience in having a pattern propounded to us of so great perfection, as is above our reach to attain to: and there may be great advantages in it. The way to excel in any kind is, to propose the brightest and most perfect examples to our imitation. No man can write after too perfect and good a copy; and though he can never reach the perfection of it, yet he is like to learn more than by one less perfect. He that aims at the Heavens, which yet he is sure to come short of, is like to shoot higher than he that aims at a mark within his reach.——TILLOTSON.

"To be born a king is a matter of chance; never forget that you are man;" said the late great King of Prussia to his nephew in his will. A sentiment that did him more honour than all his victories.

IT was a shrewd saying of the old monk, that two kind of prisons would serve for all offenders in the world, an Inquisition and a Bedlam. If any man should deny the being of a God, and the immortality of the soul, such a one should be put into the first of these, the Inquisition, as being a desperate heretic; but if any man should profess to believe these things, and yet allow himself in any known wickedness, such a one should be put into Bedlam.——TILLOTSON.

As he is a fool indeed that thinks a bead better than a pearl, and prefers a cockle-shell before a crown, such a fool is every sinner.——BISHOP BEVERIDGE.

SICKNESS——DEATH——THE GRAVE.

IN the house a sick man lies,
Writhing in his agonies;
In his chamber silence keep,
Leaving it to moan and weep;
In his presence strive to smile,
Though your heart be sad the while,
Though a dread unseen, intense,
O'er you hang in dim suspense.
In the house is noiseless stir—
Friends with anxious friends confer—
Whisperings are upon the stair—
Active service everywhere;
Not a window in the night,
But doth show some glancing light;
Fond ones to his door still creeping,
Listening if he yet be sleeping;
Thrilling at the languid tone
Of his faint and fruitless moan;
Praying with that earnest prayer
Born so often of despair.

In the house the same man lies—
Past are now his agonies;
All the anxious stir is o'er—
Flitting forms are seen no more.
Close the shutters! shun the light!
Come not into strangers' sight!
Veil the steps! be awed! be dumb!
A regal visitant hath come.
With that sick man doth he rest,
An uninvited, mighty guest.
Glide like shadows—hush the breath—
That regal visitant is Death!
In his shroud the dead man lies—
Dreamless slumber seals his eyes;
The shock that bid his pulse be still
Seems around to spread its thrill,
On each mourner's soul and sense,
With a numbing influence.
Busy labour come not near!
Sorrow keeps her Sabbath here;
Laughter! how discordant grown,
Now would seem thy softest tone;
Even the children's mirth is mute,
Lightly falls each little foot;
Near each other oft they draw,
With a dim, mysterious awe,
Soothing by companionship,
Fears that may not pass the lip;
See them to that chamber brought,
Death's first lesson to be taught—
The first conviction bringing nigh
Of their own mortality.

In his grave the dead man lies,
Needing not our sympathies!
Once again the house is rife,
With elastic, stirring life;
Gone hath that once precious clay
With its royal guest away.
Ah! that what was once so dear,
Should have grown a thing to fear!
Is it not some cause for grief,
That its departure was relief!
Light again is in his room,
Past the sable signs of gloom.
Though his memory oft is blessed,
Though deep sadness fills the breast,
His power to awe and thrill is o'er,
Remembrance doth his form restore,
Without that dim, vexatious dread,
That shrouds the most beloved dead.

[M. A. BROWNE, *in the Dublin University Magazine.*]

IT is commonly allowed that the science of human nature is of all human sciences the most curious and important. *To know ourseleves* is a precept, which the wise in all ages have recommended, and which is enjoined by the authority of revelation itself. Can anything be of more consequence to man than to know what is his duty, and how he may arrive at happiness? It is from the examination of his own heart, that he receives the first intimations of the one, and the only sure criterion of the other.——BEATTIE.

THE EVERGREEN CYPRESS

Thou graceful tree,
With thy green branches drooping
As to yon blue heaven stooping,
In meek humility.
Thou wert made to wave,
Patient when winter winds rave o'er thee,
Lowly when summer suns restore thee,
On some martyr's grave.
Like that martyr thou hast given
A lesson of faith and meekness,
Of patient strength in thy weakness,
And trust in Heaven.

THIS valuable and graceful tree is a native of the south-eastern countries of Europe, of the Levant, of China, and of several other parts of Asia. It has not been cultivated in England to any extent, for, although it is not much affected by the cold of our winter season, yet the dampness of our summer often proves fatal to it. It has become a favourite ornament of our lawns, owing to the deep hue of its evergreen branches and leaves, and the peculiarity of its upright growth. A warm sandy soil is the best adapted to it, and in its native countries, on the slopes of hills, it will attain an elevation of forty or fifty feet. Like many of the *Coniferæ*, or cone-bearing trees, the durability of its timber seems to depend chiefly on the slowness of its growth; for, in situations where it has met with too rich a soil, we find it deficient in that extreme closeness of grain and texture, which is observable in those of slower growth, and which forms the chief excellence of its timber. We find that the cypress was held in high esteem by the ancients, on account of the imperishable nature of its wood. The coffins in which the Egyptian mummies are found are usually made of cypress; and the Athenians, in order to preserve the remains of their heroes, buried them in coffins of the same material. Pliny mentions a statue of Jupiter, which had lasted six hundred and sixty-one years; while the doors of the church of St. Peter's, at Rome, formed of cypress, are stated to have been eleven centuries old, and still showing no signs of decay, when they were taken down by Pope Eugenius the Fourth, to be replaced by gates of brass. Perhaps there would be no small difficulty in getting connected evidence of the identity of these doors, through so wide a space of time; but whatever may be the truth of these accounts of the durability of the cypress, there can be no doubt but that it forms the hardest and most lasting of timber.

Where the cypress grows in sufficient abundance it is extensively used in building, and nothing can be better adapted to the purpose than a timber thus resisting the effects of time, and, in consequence of its bitter juices, impervious to the attacks of insects. The inhabitants of Crete and Malta are well aware of its advantages for this purpose, and find their dwellings, constructed of this timber, almost as lasting as if they had employed stone itself.

The cypress is one of those trees which has been considered peculiarly fitted for a place of burial; and this not only on account of its dark and sombre foliage, which gives it a melancholy character, much in accordance with such a situation, but also as a memorial of immortality, of which its surprising durability constitutes it a faint emblem. It was consecrated to this purpose in ancient times, and the remembrance of this fact can scarcely fail of exciting interesting associations whenever we view the tree: indeed the practice of planting these trees near the graves of departed friends, is not uncommon with us now.

Not long since the writer had an opportunity of observing an affecting instance of the continuance of this custom. Wandering through a picturesque little village in the south-west of England, his steps were directed to a small but ancient-looking church, situated on the declivity of a hill, and surrounded by its few simple mounds of earth and scattered grave-stones. He soon observed, a little removed from the rest, a slight iron railing, surrounding, not a tomb, not a grave-stone, nor even a mound of earth, but a single graceful cypress tree. The turf was fresh and green at its root, and the beautiful young tree waved freely in the morning air, speaking more tenderly and truly, by its hue and its bending form, of the sadness of earth; and by its nature and character, of the hope of immortality, than the most costly marble tomb or laboured epitaph could have done. He made inquiries in the village concerning this memento of affection, and found that it had been planted in memory of one, "the only son of his mother, and she was a widow."

The cultivation of the cypress tree was much attended to by the celebrated Evelyn, who had upwards of two thousand of them on his own grounds at Sayes Court, and whose experience of their capability of bearing severe frosts without injury, goes to prove that there might be some prospect of raising them to a tolerable size, as timber trees, in the southern parts of this kingdom. It is doubtful, however, considering the frequent changes of our climate, whether the timber thus raised would possess those qualities which make the foreign sorts so valuable.

There are several uses to which cypress wood might be applied, and to which it seems remarkably well adapted. Its elasticity, united with hardness, would make it a valuable material for musical instruments; and it might be used for furniture with as good effect as mahogany; for though not quite so beautiful in colour, it is still very handsome; it resists the worm equally well, and is much stronger. The odour of the cypress would also repel insects, and preserve the contents of cabinets which might be formed of it.

THE hunting tribes of air and earth
Respect the brethren of their birth;
Nature, who loves the claim of kind,
Less cruel chase to each assigned.
The falcon poised on soaring wing,
Watches the wild duck by the spring;
The slow-hound wakes the fox's lair,
The greyhound presses on the hare;
The eagle pounces on the lamb,
The wolf devours the fleecy dam;
E'en tiger fell, and sullen bear,
Their likeness and their lineage spare;
Man only mars kind nature's plan,
And turns the fierce pursuit on man.—SIR W. SCOTT.

IT was an objection constantly urged by the ancient Epicureans, that man could not be the creature of a benevolent being, as he was formed in a state so helpless and infirm; MONTAGUE took it, and urged it also. They never considered or perceived that this very infirmity and helplessness were the cause and cement of society; that if men had been perfect and self-sufficient, and had stood in no need of each other's assistance, there would have been no occasion for the invention of the arts and no opportunity for the exertion of the affections.—DR. WARTON,

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As the worm eats out the heart of the plant that bred it, so whatsoever is done amiss, naturally works no other end but destruction to him that doth it.—HALE.

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